C&W Cayman Islands Response to ICTA/Telcordia Round 2 LRIC Interrogatories [Part 5 June 22 submission]

2.3.1 In section 3.7 of C&W's response to ICTA/Telcordia interrogatories, C&W explains that it chose the asset lives assigned in the model, considering the ones identified in the benchmarks "where applicable". Where there were instances where C&W experience was at variance with the benchmarks, C&W said it used its own experience.

a. Please explain the instances where C&W experience and estimates of asset lives were at variance with the benchmarks, and explain why the views of their own engineers and network staff are so different from those benchmarks.

i. Please note that in ICTA's Decision 2005-4, the Authority made it clear that the onus is on C&W to demonstrate that its methodology complies with the Authority's principles and guidelines, and Guideline 7 states that the LRIC studies should identify and provide a basis for the projected economic life used to calculate depreciation cost of the equipment involved in providing the service or element or group of services or elements).

C&W Response

We summarize in the table below where we understand the variance to be between the asset lives assigned in the model based on C&W experience and benchmarks for analogous facilities found in public studies.

C&W Element	**Proposed Asset Life (years)**	**Benchmark Element**	**Benchmark Asset Life (years)**
Fixed Network			
1) "Duct"	20	"Duct & Trenching"	38-40
2) "Fibre Cable & Joints"	15	"Cable Infrastructure"	20-23
3) "Management Systems"	5	"Network Management"	9-10
4) "Copper Cable &	15	"Cable Infrastructure"	20-23

Joints”			
Mobile Network			
5) “Cell Site”	10	“Macrocell equipment: omni or tri-sector”	18-22
6) “TRX”	5	“TRX”	15
7)“BTS”	5	“BSC-MSC transmission - microwave link”	14
8) “BSC”	5	“BSC base unit”	14
9) “MSC”	5	“MSC”	14-15
10) “HLR”	5	“HLR”	14
11) “Network Management System”	5	“NMS”	14

With respect to ducts, trenching, cabling and joints (items 1, 2 and 4), we have not been able to find adequate comprehensive documentation of the type that Telcordia is requesting. In order to progress the resolution of the modeling, we will accept the low end of the benchmark life. We do this without prejudice to our belief that in Cayman they are on average less than the benchmarks; moreover, if the Authority subsequently proposes to revise any of the asset lives (whether for the fixed network or mobile network) downwards in reflection of Cayman specific factors such as hurricanes, we believe these assets should adjusted in a similar fashion.

For management systems (items 3 and 11), we provide the following. When a vendor discontinues a particular network component, it typically notifies of discontinuance and product end-of-life. The launch and discontinuance can serve as a proxy measure for asset life. We have looked at the three most recent instances of network management discontinuance from our vendor and compared them with the relevant launch dates. We attach the documentation in confidence in Appendix IX. The three network management systems are ###-### ### ### ###, ### ### ### and the ### ### ###. We summarise the launch date and discontinuance dates in the table below. On the basis of this data, we believe 5 years is a reasonable economic life.

System	*Launch Year*	*Discontinuance Year*
###-### ### ### ###	2000	2006
### ### ###	1999	2002

### ### ###	2001	Significant subcomponents 2005; completely by 2010

With respect to the mobile network, we note that following. For the MSC and HLR (items 9 and 10), our assumption of five years was based on our replacement plans. In our confidential Appendix X, you see that our current plans envisage ### ### ### ### ### ### ### ### ### ### ### ###. As our existing switch became functional in 2003#, a five year asset life is reasonable. However, we have done some additional research in order to make this estimate more robust. Our vendor has provided a product roadmap that illustrates that its MSC and HLR products (### ### ### ###) are as of this year being replaced by the next generation products—### ### MSC server and HLR. C&W implemented its current generation of these facilities in 2003, although the current technology was first introduced in 2000. Secondly, there is a recent Swiss study that suggests that MSC is asset life is 10 years (the article is provided as Appendix XI). As a result of this additional research and in order to progress the resolution of the modeling, we would accept a mid-point between our original assumption and the benchmark life.

For the BTS, the existing products, ### ### ### ###, which were introduced in 2000 are being phased out in the third quarter of this year with the introduction of its successor product, the ### ###. Also, the Swiss study that we refer to above, also carries an asset life of 7 years for the BTS.

For the remaining kit, C&W does not presently have the same type of vendor generational information for the other facilities as we've supply above. Our original proposals were based on expectations of how long this kit would stay in operation. The storm has made the estimate a bit more difficult as many of these items had to be replaced before their expected end-of-life. We still believe that the benchmarks are excessively large. The Swiss study seems to concur with this general assessment. In addition to those asset lives already cited, please note that that the Swiss studies estimate for BSCs is 8 years.

3.2.1 In the previous round of interrogatories, ICTA requested a complete description of the fixed network components complete with their engineering and dimensioning information. In response, C&W identified Subsections 9 through to 13 of the "Methodology" section of the Fixed Model document as fully describing the network components modeled in the fixed bottom up model. Subsections 9 through 13 only provide a brief definition of the network components. This level of detail is satisfactory for Access Network components and the Core Transmission components. However, for the Switching components more detail is required. In the model, the Media Gateway (MG) component is not treated as a whole. The investment associated with the MG component is split into the RSU Traffic Sensitive and RSU Line Sensitive network element categories. Likewise, in the model the Softswitch/Multi-Service Edge and Voice Packet Gateway component is not treated as a whole. The investment associated with the Softswitch/Multi-Service Edge and Voice Packet Gateway component is split into the PSTN/Host Switch Call Sensitive and PSTN/Host Switch Duration Sensitive network element categories. Please provide a breakdown of the MG component and the Service Edge and Voice Packet Gateway component into their sub-components and provide a thorough description of each sub-component.

C&W Response

With respect to the MG, the component parts include racks that house shelves, which contain between 12-16 interface (subscriber) cards each. The first shelf has two cards for interface to the Softswitch. An MG can consist of up to three racks. Each rack consists of four shelves and the power/alarm distribution panel at the top. All of these components are housed within a single frame. For more detail on the specification of the product, we attach in confidence, Appendix XII.

Ultimately, virtually all these components are subscriber line-driven. The frame and the power unit are with respect to lines. They are not priced separately, however. This is why in the model we have derived the fixed portion on the basis of actual installed units.

With respect to Softswitch and Service Edge and PVG, after speaking with our vendor, our best estimates as to the breakdown between call set-up and traffic support (conveyance) driven costs are as follows.

The *call server hardware, software and gateway controllers*, which manage the access and trunking gateways, are housed together. After consultation with our vendor, we believe these elements are best classified as call-related. The attached product brief, in confidence, Appendix XIII, provides additional documentation as to the call-driven nature of these components.

The *routing switch*, which is largely scaled to bandwidth parameters. We believe, therefore, believe this can be classified as largely conveyance driven. We attach a product brief, in confidence, Appendix XIV.

The *ATM switch, which can be set up as a packet voice gateway*. Again, this is largely scaled to trunk densities and therefore conveyance-driven. We attach a product brief, in confidence, Appendix XV.

The *IMS or integrated multi-media server* enables a number of value-added services for residential and business customers. We therefore think that it is most properly classified as call-set-up driven. Its features are detailed in an extract from our vendor product description, in confidence, Appendix XVI.

The *signaling gateway* ensures unified signaling across all networks whether they are using IP or SS7. As a signaling element, we believe this is best modeled as a call set-up driven cost. We attach a product brief, in confidence, Appendix XVII.

Taking this classifications and paring them up with the respecting capex involved, we arrive at a division of 74% call-set up driven, 26% call conveyance driven.

Component	Investment (CI$)	Classification
Call Server Hardware	###	Set up
Call Server Software	###	Set up
IMS	###	Set up
Gateway Controller	###	Set up
Signalling	###	Set up
Routing Switch	###	Conveyance
ATM Switch and Packet Voice Gateway	###	Conveyance
Total	###	
Of which, Call-set up	### or ###	
Of which, Conveyance	### or ###	

3.2.2 In the previous round of interrogatories, ICTA requested a full description of the network dimensioning rules and assumptions used in the dimensioning of the fixed network. In response, C&W identified Subsections 15 through to 37 of the "Methodology" section of the Fixed Model document as fully describing the dimensioning rules employed in dimensioning the fixed model network elements. Subsections 15 through 37 only provide a brief definition of the rules and assumptions that underpin the dimensioning of the fixed network. This level of detail is satisfactory for Access Network components and the Core Transmission components. However, for the Switching components more detail is required.

Subsections 30 through 33 describe how the total cost per MG is calculated and how the total cost is split into fixed and variable costs by calculating a ratio of fixed costs as a percent of total. In order to determine if the split of the MG investment into fixed and variable costs is correct, the dimensioning rules for each of the MG sub-components is required. Please provide the dimensioning rules for each of the MG sub-components.

Subsections 34 through 37 describe how the total cost per Softswitch is calculated. An examination of the model shows that the total Softswitch investment is split into call and duration sensitive costs by using the Softswitch ratio of call-sensitive/duration-sensitive. In order to determine if this split is correct, the dimensioning rules for each of the Softswitch sub-components is required. Please provide the dimensioning rules for each of the Softswitch sub-components.

C&W Response

Please see our response to 3.2.1 above. Again, for the MG, the fixed components are not separately priced, so in order to break out the fixed component, we have had to derive by mapping capex across MGs to lines and estimate the fixed portion of capex. With the softswitch, in our response to 3.2.1, we have classified the drivers of the dimensioning for each component.

4.1.2 In the first round interrogatories, C&W was asked to explain the determination of the allocation percentage into Call Attempts, Minutes, and Subscribers of various equipment. C&W responded that in the absence of a more accurate allocation basis for MSC and HLR, C&W thought it reasonable to apply a 50/50 split to these components. It reported that all other components are allocated 100 percent to their respective function. However, in order to determine if for the MSC the 50/50 split between Traffic Minutes and Call Attempts is appropriate, and for the HLR the 50/50 split between Call Attempts and Subscribers is appropriate, and for the BTS, BSC, TCU, SGSN, and GGSN the 100 percent allocations are appropriate, more detailed is required. Please provide a breakdown of the MSC, HLR, BTS, BSC, TCE, SGSN, and GGSN into their sub-components and provide a thorough description of each sub-component along with the dimensioning rules for each of the sub-components.

C&W Response

With respect to the MSC, it can be described as consisting of a Hardware system, Software system and Signaling system, plus common components such as power and network management systems.

The main components of the Hardware system are:

###-### ### 7+1 with 10 Shared Memory Cards
48K ENET
2 DTC
10 PDTC
CABINET
4 ### OC-3

The ### ### (### ###) is a scalable multi processing engine that distributes call processing over multiple, independent processor elements.

The ENET (Enhanced Network) main function is to switch calls to their destinations. The ENET is designed to support both voice and narrow band data and is provisioned in standard shelves which are expandable.

The ### (### ### ###)# is an integrated system that streamlines end offices by integrating high-speed fiber (OC-3) trunks directly into the ###-### system,

DTC and PDTC are Trunk Controllers provisioned in Shelves with the PDTC designed to accommodate packetized transmissions.

The main components of the software system are:

Software
Software

Here the software required to support the hardware are captured. The ###-### and ### software provides the processing power for the calls registered on the system.

The main components of the Signaling system are:

MSC Signaling System

CCS7 - Signaling links
9 LIS Shelves
9 NIU (Network Interface Unit)

The Signaling system provides control and messaging links for the network, integrating the various network components through SS7 communication links.

Generally the Hardware system provides call conveyance functionality and the Signaling and Software systems supports predominantly Call setup and signaling functionalities. The following offers a breakout of the investment cost between Call Conveyance and Call Setup and Signaling. The results suggest that (excluding “fixed”-neither call attempt or conveyance driven- components) call conveyance carries approximately 79% of investment cost and the call setup components carries about 21%.

MSC HWR (Network Switching Subsystem)	###	Conveyance
###-### ### 7+1 with 10 Shared Memory Cards		
48K ENET		
2 DTC		
10 PDTC		
### CABINET		
4 ### OC-3		
MSC SWR (Network Switching Subsystem)	###	Setup
### ### Software		
### ### ### SW		
MSC Signaling System	###	Setup
CCS7 - 77 LIU-CBI		
3 FLPP		
9 LIS Shelves		
9 NIU		
	###	
MSC POWER	155,649	“Fixed”
INTEGRATED MSC OEM	326,464	“Fixed”
NT SERVICES	437,901	“Fixed”
	920,014	
Total	2,857,422	
Conveyance	Setup	
79%	21%	

We were unable to breakdown the HLR into detailed costs. In discussing the drivers with our vendor, we concluded that the division is between call set-up and subscriber driven is best characterized by the difference between hardware and software costs. The software is in general dimensioned based on subscriber numbers. We note, however, that the minimum software purchased will be adequate to the subscriber numbers involved in this exercise (see our response to 4.5.1). See Appendix XVIII attached in confidence. The hardware is arguably depreciated as a function of call attempts. Given that core switching hardware to software costs are roughly 4:1, a 80-20 split seems reasonable.

With respect to the BTS, we note that all costs are allocated by minutes. The BTS is made up primarily of the TRXs (and software and electronics directly related to the TRXs), but also naturally contains a cabinet and power unit. We could not find a system wide breakdown of costs, but have a sample BTS costing that we have included in confidential Appendix XIX. It demonstates that the cost is overwhelming (over 80%) TRX related. Therefore, traffic minutes were assumed to be the driver. Please see also see the product brief Appendix XX attached in confidence.

The BSC and TCU cost are allocated on the basis of traffic. Our vendor documentation is clear that the BSC and TCU are scaled by erlangs of traffic. Please see Appendix XXI attached in confidence. The only exception that we find would be, again, the physical cabinet, installation kit and power which are not separately price, but would constitute a very small portion of the total cost.

With respect to both the SGSN, we note that it is 100% allocated by minutes in the model. We note that, according to the literature, the SGSN is generally independently scaleable by subscribers and throughput. Please see Appendix XXII attached in confidence. However, because the minimum capacity nearly virtually meets all subscriber demand, we had chosen to drive all costs through minutes.

With respect to the GGSN, we feel the case is even clearer to allocate purely on the basis of minutes. The minimum configuration exceeds our subscriber base, but more importantly the capacities all appear to be traffic driven. Please see Appendix XXIII attached in confidence.

With respect to the Internet Gateway, we note that this is the SS7/IP Gateway that sits between the SGSN and the MSC/HLR. Given that it is running traffic, we believe this is a simple choice of 100% traffic driven.

4.5.1 In the previous interrogatories, C&W was asked to explain how the following technical assumptions were determined:

a.	MSC increment	cell D49
b.	HLR increment	cell D50

c. Number of cell sites per BSC cell D51
d. PCU Capacity cell D52
e. SGSN capacity cell D55
f. GGSN capacity cell D56
g. Internet Gateway Capacity increment cell D59

C&W responded that "these represent the minimum capacity constraint applied to each listed increment and are all industry benchmark figures supported by C&W's engineers and considered to be reasonable and appropriate estimates." Please provide the documentation for each of these minimum capacity constraints.

C&W Response

With respect to MSC and HLR, we were able to determine that the minimum number of subscribers is higher than what we had set out. ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ###. Appendix XXIV attached in confidence shows features and benefits, which indicates that available switching platform at a minimum 1 million and HLR is up to 2 million. Our assumption of the MSC increment in terms of subscribers, we note, does not indicate that switching cost are subscriber driven. The elements within the switching platform are generally driven by numbers of calls and traffic minutes as described in our response to 4.1.2.

Our assumption of 20 cell sites to BSC was based on C&W actual experience. The actual total number of cell sites served by a BSC may be a function of cell sites, the type of cell site and the traffic each cell site generates. In Appendix XXI, attached in confidence, it indicates the maximum number of E1s(T1s) per BSC. These trunks would be used both for the BSC-to-MSC links and the BSC-to-cell-site links. Thus, if one makes the simplifying assumption that half of the trunks are available for the BSC-to-cell links, then 62 E1s would be available. Therefore the number of cells served could vary up to 62.

With respect to the PCU, the smallest capacity that our vendor now offers is their ###, which can carry up to 12 AGPRS Links. The AGPRS link is the link between the BSC and the BTS. Assuming the link is a T1, then there are 24 DS0 (24*64k) of bandwidth. 1 DS0 is used for signaling, the other 23 are for traffic. Each radio (carrier) has 8 time slots. Each radio requires 2 DS0; therefore each radio timeslot is ¼ of a DS0. The AGPRS links therefore support 24-1=23 DS0 times 4 radio time slots = 92 ¼ radio timeslots for packet data. 12 AGPRS line * 92 radio ¼ timeslots = 1104 radio time slots. Please also see product brief Appendix XXV attached in confidence. Although it will not have an impact on the results for the given scale we are modeling, we believe this assumption can be increased from 270.

With respect to the SGSN capacity, we note that the modularity in the equipment is afforded by control processor cards and functional processor cards. Please see Appendix XXII attached in confidence. Our vendor has confirmed that the threshold increment is the GPRS per subscriber control card, the GSC, and that our assumption of 30,000 subscribers per card is reasonable.

With respect to the GGSN, our vendor has also confirmed that the GGSN's threshold increment is the SSC card. Based on the current hardware and software versions, the SSC card will support around 70,000 active users. Since they have 4 cards deployed (3+1) the maximum is 3*70K = 210K. We understand that there are new hardware and software versions which will allow these cards could be replaced with more current ones which, with the same customer call profile, could reach as high as 400K active subs or around133K subs per card. Of course they could also add more cards.

With respect to the Internet Gateway, we based on increments on the number of subscribers and their implied data flow of some 16Mbps max, but in retrospect we believe that this is better modeled by pairing the Gateway up—one for one--with the number of SGSNs.